

CLAIMS

We claim:

1. A method of fabricating an MIS device comprising:
providing a semiconductor substrate;
5 forming a trench in said substrate;
depositing a mask layer in said trench;
etching said mask layer to form an exposed area at a bottom of said trench;
forming an insulating layer in said exposed area;
depositing a conductive material into said trench; and
10 creating a contact between said conductive material and a metal layer
overlying said substrate.
2. The method of Claim 1 wherein forming an insulating layer comprises
depositing an oxide layer.
3. The method of Claim 2 wherein said oxide layer deposits preferentially on
15 said exposed area as compared with said mask layer.
4. The method of Claim 1 wherein forming an insulating layer comprises heating
said substrate to thermally grow an oxide layer.
5. The method of Claim 4 wherein growing said oxide layer causes a portion of
said mask layer to lift off from a surface of said trench.
- 20 5. The method of Claim 1 wherein said trench is located in a gate bus region of
said device.
6. The method of Claim 1 wherein said trench is located in a termination region
of said device.
7. The method of Claim 1 wherein depositing a conductive material into said
25 trench comprises depositing doped polysilicon in said trench.
8. The method of Claim 1 wherein depositing a mask layer comprises depositing
silicon nitride.

9. The method of Claim 1 wherein said substrate comprises silicon.
10. A trench MIS device formed in a semiconductor substrate and comprising and active region and an inactive region, said active region comprising:
- 5 a first trench containing a first conductive gate material;
- a source region in said substrate; and
- a body region adjacent a side wall of said trench, said trench being lined with a thin insulating layer adjacent said body region;
- said inactive region comprising:
- 10 a second trench containing a second conductive material, said second conductive material being in electrical contact with said first conductive material;
- a relatively thin insulating layer on a side wall of said second trench;
- a relatively thick insulating layer on a bottom of said second trench; and
- a gate bus in contact with said second conductive material.
11. The trench MIS device of Claim 10 wherein said relatively thin insulating
- 15 layer covers a corner region between said bottom and said side wall of said second trench.
12. The trench MIS device of Claim 10 comprising a transition region between said relatively thick insulating layer and said relatively thin insulating layer, said transition region comprising a graduated insulating layer abutting said relatively thick and relatively thin insulating layers, a thickness of said graduated insulating layer decreasing gradually in
- 20 the direction from said relatively thick insulating layer towards said relatively thin insulating layer.